Superfund Records Center
SITE: Kearsarge
BREAK: 8.3
OTHER: 45727

Five-Year Review Report

Second Five-Year Review Report
for
The Kearsarge Metallurgical Corporation Superfund Site
Town of Conway
Carroll County, New Hampshire

September 2003

Prepared by:
The United States Environmental Protection Agency
Region 1, New England
Boston, Massachusetts

EPA
New England

Approved by:

for Susan Studlien, Acting Director
Office of Site Remediation and Restoration
U.S. EPA, New England

Date:

9-30-03

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LIST OF ACRONYMS

ARARs	Applicable and/or Relevant and Appropriate Requirements
bgs	below ground surface
CDM	Camp Dresser and McKee,Inc.
CoCs	contaminants-of-concern
CVFD	Conway Village Fire District
1,1-DCA	1,1-Dichloroethane
1,2-DCA	1,2-Dichloroethane
1,1-DCE	1,1-Dichlorethylene
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FS	Feasability Study
ft	feet/foot
GC	gas chromatography
gpm	gallon per minute
GWTP	Ground Water Treatment Plant
KMC	Kearsarge Metallurgical Corporation
LTRA	Long-Term Response Actions
µg/L	microgram per Liter
mg/kg	milligram per kilogram
MtBE	methyl-tert-butylether
NGVD	National Geodetic Vertical Datum
NHBSWM	New Hampshire Bureau of Solid Waste Management
NHDES	New Hampshire Department of Environmental Services
NIPDWR	National Interim Primary Drinking Water Regulation
NPL	National Priorities List
O&M	Operation and Maintenance
pH	hydrogen ion concentration
POTW	Publicly Owned Treatment Works
ppb	parts per billion
ppm	parts per million
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RPM	Remedial Project Manager
SARA	Superfund Amendments and Reauthorization Act

LIST OF ACRONYMS (continued)

SWPA	Source Water Protection Area
1,1,1-TCA	1,1,1-Trichloroethane
TCE	Trichloroethylene
VOCs	volatile organic compounds
WESTON®	Weston Solutions, Inc.
yd^3	cubic yards

EXECUTIVE SUMMARY

The purpose of this Five-Year Review is to determine whether the remedy implemented at the Kearsarge Metallurgical Corporation Superfund Site is protective of human health and the environment. The review was conducted in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act § 121, the National Contingency Plan, and the *Comprehensive Five-Year Review Guidance* (EPA, June 2001). Elements of the review included:

- A review of site background, land use, history of contamination and response actions.
- A site visit.
- Review of remedy selection and implementation.
- Interviews of local officials and interested parties.
- Review of changes to toxicity values and Applicable or Relevant and Appropriate Requirements since the last Five-Year Review.
- Review of progress since the last Five-Year Review.
- Review of historic Long Term Response Action (LTRA) operations, maintenance and monitoring data.
- Technical assessment of the remedy.
- Determination of Remedy Protectiveness.

In 1990, the U.S. Environmental Protection Agency (EPA) issued a *Record of Decision (ROD)* that details the clean up plan requiring that on-site waste piles be removed and that the ground water be treated. As a pilot for the Superfund Accelerated Cleanup Model initiative, Operable Unit (OU) 1 was implemented and the large waste pile and other source materials were removed by fall of 1992. Operable Unit 2, the ground water pump and treat facility, has been operating continuously since the fall of 1993. A *Superfund Amendments and Reauthorization Act (SARA) Five-Year Review* was conducted in the summer of 1998 and published in July of that year. This report documents the findings and conclusions of the second *SARA Five-Year Review* for the

Site. The action that triggered the Five-Year Review cycle was completion of OU 2 construction, the ground water remediation system for the selected management of migration remedy, on 24 September 1993.

The selected remedy(ies) as documented in the *ROD* (EPA, 1990) was/were as follows:

- Source Control - OU 1:
  - Removal of the septic tank and its contents and transport to an off-site incinerator for thermal destruction.
  - Excavation of contaminated leach field soils and disposal at an off-site Resource Conservation and Recovery Act Subtitle C facility.
  - Excavation and off-site disposal of the materials in the two waste piles.
- Management of Migration - OU 2:
  - Extraction of ground water and containment of plume via extraction wells or trenches.
  - Treatment of extracted water via air stripping and carbon polishing.
  - Discharge of treated ground water to the Publicly Owned Treatment Works (POTW).
  - Long-term ground water monitoring.

The selected remedy, as prescribed in the ROD and as later revised in two Explanation of Significant Differences documents (ESD, EPA 1992 and ESD, EPA 2003) included provisions for achieving the following cleanup goals:

Ground water:

- 1,1,1-Trichloroethane - 200 microgram per Liter (µg/L)
- 1,1-Dichloroethylene - 7 µg/L
- 1,2-Dichloroethane - 5 µg/L
- Trichloroethylene - 5 µg/L
- 1,1- Dichloroethane - 3650 µg/L
- Chloroform - 100 µg/L
- Chromium - 50 µg/L
- Nickel - 700 µg/L

Soil:

- 1,1,1-Trichloroethane - 300 µg/kg
- Chromium - 1,400 mg/kg

Soil cleanup goals were achieved via soil excavation activities, completed in 1992. Ground water extraction and treatment and accompanying LTRA activities have been ongoing since September 1993. The primary components of LTRA are associated with the selected management of migration alternative that includes:

- Extraction of ground water and containment of plume via extraction wells or trenches.
- Treatment of extracted water via air stripping and carbon polishing.
- Discharge of treated ground water to the POTW.
- Long-term ground water monitoring.

Figure ES-1 depicts the ground water contaminant plumes during three time periods: prior to remedial system start-up, following five years of operation, and at present, respectively. As shown in the figures, the remedy is functioning as intended by the *ROD* (EPA, 1990), with the exception that historic and recent ground water data indicate after nearly 10 years of operation of the ground water extraction and treatment system, there are still exceedances of the *ROD* (EPA, 1990) and *ESD* (EPA, 2003) clean up goals for select contaminants of concern (1,1,1-trichloroethane, trichloroethylene, and 1,1-Dichlorethylene, – See Subsection 6.4.2). Although ground water contaminant concentrations have decreased overall at this Site, and the plume has decreased in aerial extent, there continue to be clean-up goal exceedances in multiple wells in the Culvert Area during each sampling round.

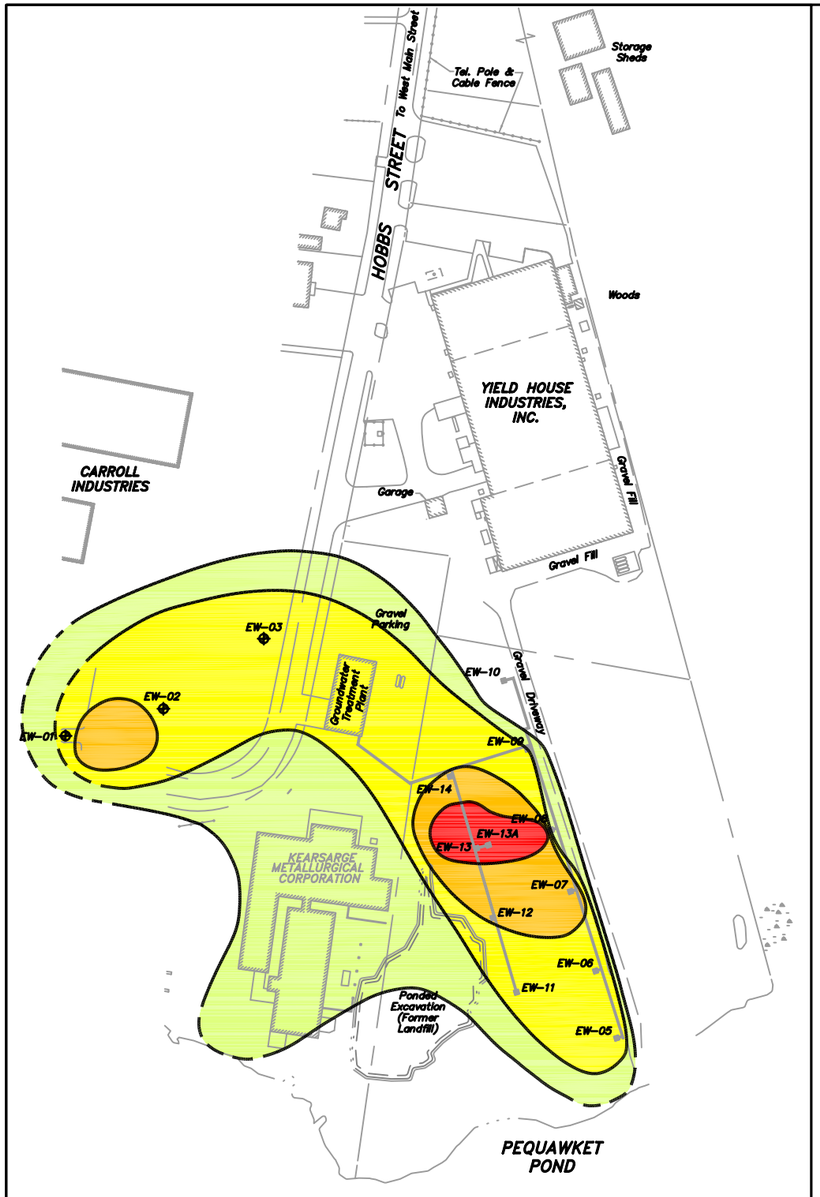
Based on the information gathered in support of this Five-Year Review, the remedy as implemented is currently protective of human health, public welfare, and the environment. However, exceedances of cleanup goals for 1,1,1-Trichloroethane located in the Culvert Area of the Site indicate that the remedial action objectives of the *ROD* (EPA, 1990) have not yet been met, and are not likely to be achieved in the prescribed

time period (10 years from start up of LTRA activities). In addition, unless additional source excavation activities are implemented, it could be 50 years or more, until ROD cleanup goals are achieved. Details of the additional source requirements are provided in Section 9.

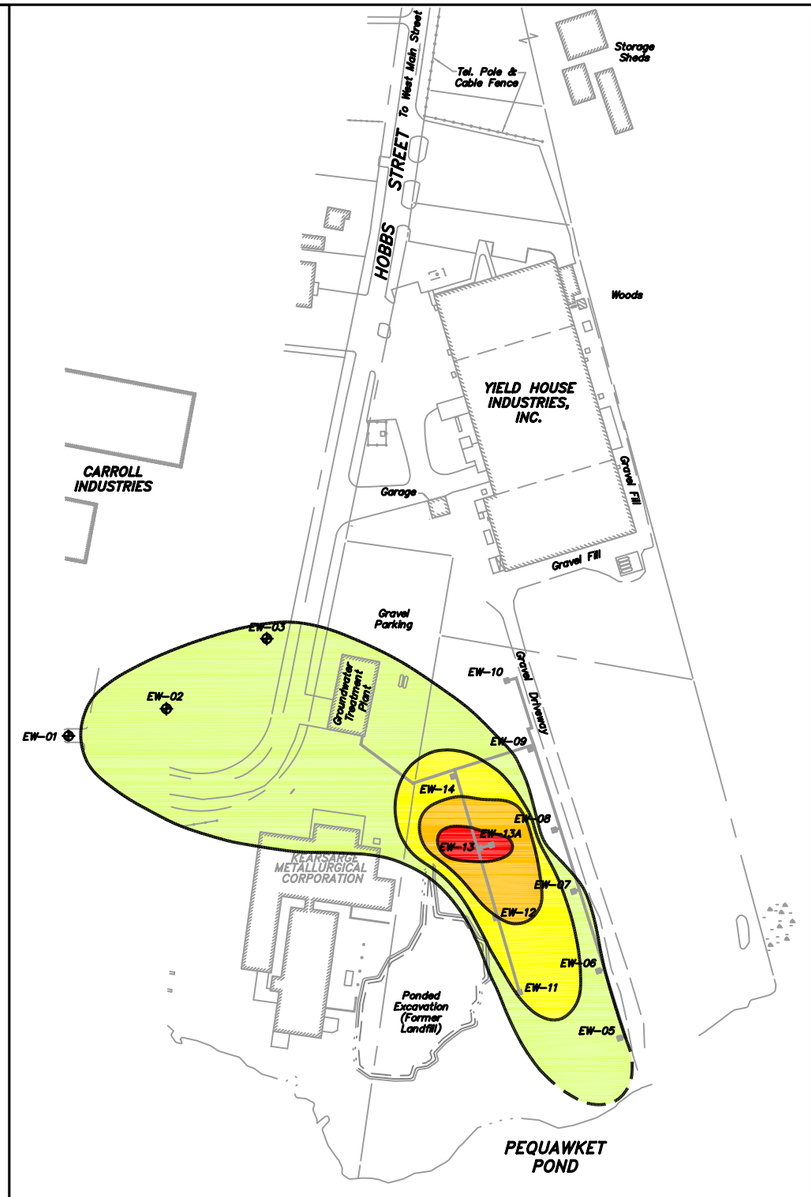
Based on the information gathered in support of this Five-Year Review, the following protectiveness statements are made:

- The remedy at OU 1 is protective of human health and the environment.
- The remedy at OU 2 currently protects human health and the environment since a ground water extraction and treatment remedy is operating at the Site. However, in order for the remedy to be protective in the long term, additional source control and optimized ground water extraction actions need to be taken to ensure long term protectiveness.

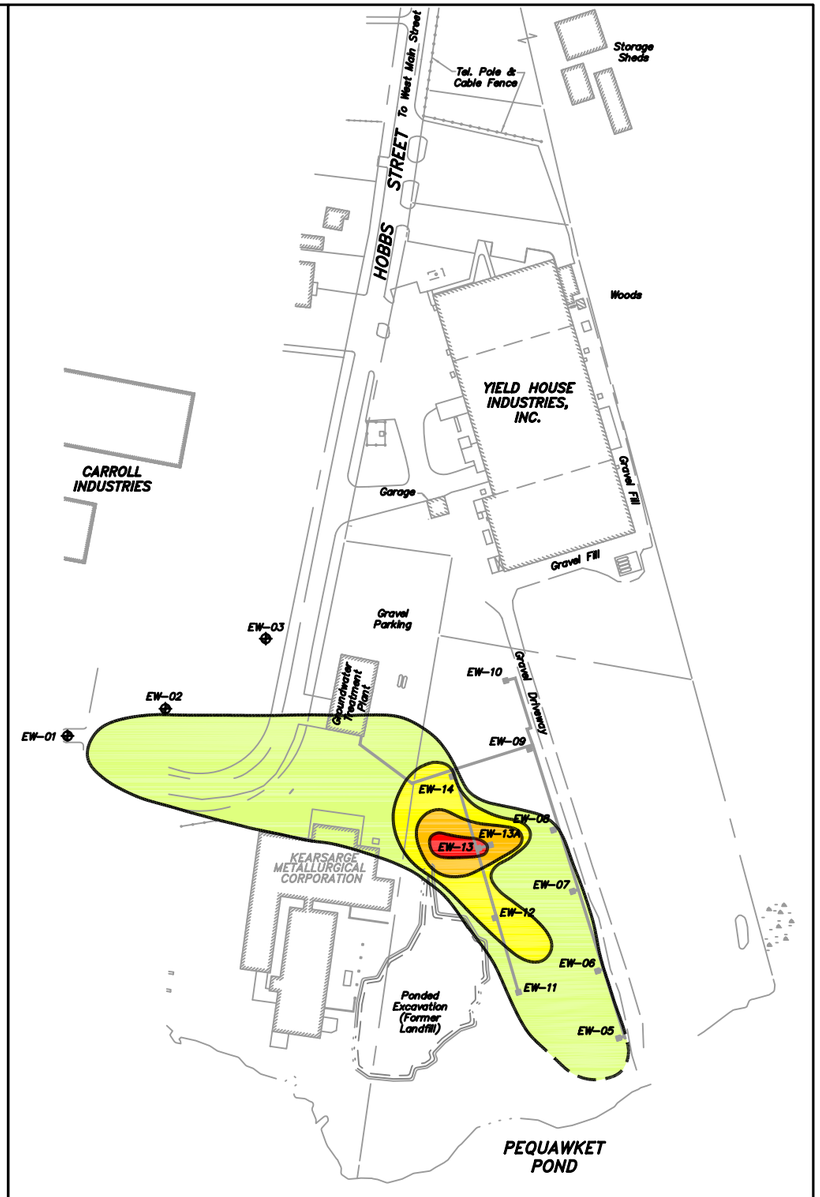
Because the remedial action at all OU's is protective, the Site is protective of human health and the environment.



1991 – 1992 SAMPLING ROUNDS



1997 – 1998 SAMPLING ROUNDS



2002 – 2003 SAMPLING ROUNDS

LEGEND

- >10,000 ppb TOTAL VOC's
- >1,000 ppb TOTAL VOC's
- >100 ppb TOTAL VOC's
- >CLEANUP GOALS

CLEANUP GOALS

1,1,1–TCA	200 ppb
1,1–DCA	4 ppb
1,1–DCE	7 ppb
1,2–DCA	5 ppb
TCE	5 ppb

GRAPHIC SCALE
200 100 0 100 200
APPROXIMATE SCALE IN FEET

TOTAL VOC CONCENTRATIONS IN GROUNDWATER (EXISTING CLEANUP GOALS)

NHDES
KMC SUPERFUND SITE
CONWAY, NEW HAMPSHIRE

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

WESTON SOLUTIONS
MANCHESTER NEW HAMPSHIRE

DRAWN A.J.M.
DATE SEP. 2003
FIGURE NO. ES–1

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Five-Year Review Summary Form

SITE IDENTIFICATION

Site name: Kearsarge Metallurgical Corporation

EPA ID: NHD062002001

Region: 1	**State:** New Hampshire	**City/County:** Conway / Carroll

SITE STATUS

NPL status: ✔ Final ☐ Deleted ☐ Other (specify) _____

Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ✔ Complete

Multiple OUs?* ✔ YES ☐ NO	**Construction completion date:** 9/24/93

Has site been put into reuse? ☐ YES ✔ NO

REVIEW STATUS

Lead agency: ✔ EPA ✔ State ☐ Tribe ☐ Other Federal Agency NHDES is operating plant

Author name: Richard Goehlert

Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA

Review period: 04/15/03 to 09 / 30/03

Date(s) of site inspection: 04/18/03

Type of review:

✔ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion

Review number: ☐ 1 (first) ✔ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____
✔ Construction Completion ✔ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date ***(from WasteLAN)*****:** 07/08/1998

Due date ***(five years after triggering action date)*****:** 07/08/2003

* ["OU" refers to operable unit.]

Five-Year Review Summary Form, cont'd.

Issues:

1. An error for the ROD clean up goal for 1,1-DCA in ground water needs to be corrected in an ESD.
2. Contaminant concentrations in monitoring well MW 211 have been recalcitrant. TCE levels have consistently remained above clean up goals, despite reductions in nearby wells.
3. Additional source excavation activities in accordance with an ESD need to be implemented to assure attainment of clean up goals within a reasonable time frame.
4. There is a need to further optimize ground water contaminant capture in the Culvert Area .to expedite achievement of clean up goals.
5. Certain non-routine maintenance items are in need of being addressed, including change out of carbon vessels and cleaning or replacement of air stripper media.

Recommendations and Follow-up Actions:

1. An ESD issued in September, 2003 addressed items 1 and 3 above. NHDES has contracted for the source excavation to begin in October, 2003.
2. NHDES will have engineering consultant perform pump tests in the MW 211 area and determine cause of slow progress for item 2 above. A remedy will be proposed to accelerate clean up in this area.
3. Item 4 will be addressed as part of the excavation of the source material in the Culvert Area with a new extraction trench.
4. Non routine maintenance will be performed over the next nine months to insure proper plant operation to address item 5 above.

Protectiveness Statement:

Based on the information gathered in support of this Five Year Review, the following protectiveness statements can be made:

- The remedy at OU 1 is protective of human health and the environment.

- The remedy at OU 2 currently protects human health and the environment since a ground water extraction and treatment remedy is operating at the site. However, in order for the remedy to be protective in the long term, additional source control and optimized ground water extraction actions need to be taken to ensure long term protectiveness.

Because the remedial action at all OU's is protective, the Site is protective of human health and the environment.

1. INTRODUCTION

The purpose of five-year reviews is to determine whether the remedy implemented at site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this Five-Year Review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act § 121 and the National Contingency Plan (NCP). CERCLA § 121 C states:

> *If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The Agency interpreted this requirement further in the NCP; 40 CFR§ 300.430(f) (4) (ii) states:

> *If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.*

The EPA, Region 1-New England office, conducted this policy Five Year review of the remedial action implemented at the Kearsarge Metallurgical Corporation (KMC) Superfund Site (the "Site") located in Conway, New Hampshire from April to September, 2003. Weston Solutions, Inc. (WESTON®) prepared several analyses in support of this review for EPA and the New Hampshire Department of Environmental Services (NHDES). This report documents the results

of the review and constitutes the second Five-Year Review of the selected remedy for the KMC Site. The first such review was published in July 1998. The action that triggered the Five-Year Review cycle was completion of construction of the ground water remediation system, the selected remedy for the KMC Site on September 24, 1993.

2. SITE CHRONOLOGY

The Kearsarge Metallurgical Corporation (KMC) manufactured precision stainless steel castings on a four-acre parcel of land from 1964 until it went out of business in 1982. The Site (the KMC parcel plus two adjacent parcels) was placed on the EPA's National Priorities List (NPL) in 1984 after investigations showed that ground water under the Site was contaminated with volatile organic compounds (VOCs) including 1,1,1-trichloroethane (1,1,1-TCA). Evidence of industrial waste, which was produced from the cast-making processes (casting, cleaning, finishing, and pickling) were found on the Site, including a large, 15-foot (ft)-high pile of approximately 9,000 cubic yards (yd^3) of solid waste and a smaller pile of approximately 400 yd^3 .

In 1990, EPA issued a cleanup plan called a *Record of Decision (ROD)* requiring that the waste piles be removed and that the ground water be treated. As a pilot for the Superfund Accelerated Cleanup Model initiative, the large waste pile and other source material, identified as Operable Unit (OU) 1, was removed by fall of 1992. OU 2, the ground water pump and treat facility, has been operating continuously since the fall of 1993. A Five Year Review was conducted in the summer of 1998 and published in July of that year. This report documents the findings and conclusions of the second post *Superfund Amendments and Reauthorization Act (SARA)* Five-*Year Review* for the Site. This post-*SARA* review is being conducted as a matter of EPA policy, until clean up levels are achieved, allowing unlimited use and unrestricted exposure.

At the end of the first 10 years of Long Term Response Action (LTRA), EPA will turn over full responsibility for the continued remedial action efforts, Operation and Maintenance (O&M), to NHDES. This conversion to LTRA will be effective May 31, 2004.

Table 2-1 provides a chronology of key events/regulatory milestones in the Site's history.

Table 2-1
Chronology of Site Events
Kearsarge Metallurgical Corporation Superfund Site
Conway, New Hampshire

Event	Date
Operation of Site as a sawmill.	Pre-1964
Operation of Site as KMC for manufacture of stainless steel castings.	1964 - 1982
Discharge of acids, chlorinated solvents, caustics, and flammable liquids to ground surface (waste piles) and septic system.	1970s
New Hampshire Water Supply and Pollution Control Commission notifies KMC that discharges to ground/septic system are illegal.	1979
EPA and New Hampshire Bureau of Solid Waste Management (NHBSWM) issue verbal order to re-containerize corroded drums in the waste piles.	September 1981
NHBSWM issues Letter of Deficiency to KMC.	December 1981
Indian Head bank takes possession of KMC Lot 8 (now lot 140). Site abandoned.	1982
Containerized wastes removed from the Site in response to verbal order from EPA and NHBSWM.	June 1982
NHBHWM issues a Notice of Violation and Order of Abatement to KMC.	October 1982
NHBHWM begins hydrologic investigation of Site.	December 1982
EPA and NHBSWM order KMC to remove waste piles from the Site.	May 1983
KMC Site added to the NPL.	September 1984
Consent Order – State of New Hampshire vs. KMC, orders KMC to perform RI/FS.	July 1985
Commencement of Remedial Investigation/Feasability Study (RI/FS) activities by GEI.	July 1985
Release of RI/FS (completed by Camp Dresser & McKee, Inc. [CDM]) to public. Release of Proposed Plan to public.	June 1990
Action Memorandum providing for removal of seven drums of uncharacterized materials from the Site is issued by EPA.	September 1990
ROD signed by EPA.	September 1990
Explanation of Significant Differences (ESD) providing for some changes/clarifications to the *ROD* (EPA, 1990) Selected Remedy.	August 1992
Source Control Remedial Action Completed.	September 1992
Ground water Pump and Treat System begins operation.	September 1993
First SARA Five-Year Review completed.	July 1998
Capture Zone Analysis For Conway Village Fire District Wells No. 1 and No.2.	January 2001
An active soil gas survey initially conducted by EPA.	October 1999
Cooperative Agreement between the EPA and NHDES stating the takeover by NHDES of the O&M of the extraction system and treatment plant.	August 1, 1994
Modified the ground water system by installing ground water recovery trench and Extraction Well EW-13A; completed WESTON.	October 2000

Event	Date
Passive Soil Gas Survey completed by WESTON.	April 2002
Vertical Profiling Study completed by WESTON.	June/July 2002
Geoprobe Coring Investigations completed by WESTON.	November 2002
EPA and NHDES met with Conway's town engineer to discuss source remediation and receive town's feedback.	March 2003
EPA and NHDES attended a Town of Conway selectmen's meeting and reviewed future excavation activities work and gave overview of site status and responded to questions.	July 2003
Annual O&M Monitoring Reports completed by Roy F. Weston, Inc./WESTON.	1993-present
ESD providing for additional source material excavations.	September 2003
Ten years of O&M completed. NHDES assumes full responsibility for LTRA.	May 31, 2004

3. BACKGROUND

The KMC Site (EPA I.D. Number NHD062002001, CERCLIS Site I.D. Number 0101105) is comprised of three parcels of industrial land located on Hobbs Street in Conway, Carroll County, New Hampshire (See Figure 3-1 – Attachment A). As described above, the Site was added to the NPL on 21 September 1984.

Figure 3-2 (Attachment A) depicts the Site, which is comprised of lots 139, 140, and 182 as depicted on Map 227 at the Conway Tax Assessor's Office. The current owner of lot 139 is OCR, Inc. and lot 140 is the defunct KMC. Lot 182 is owned by Conway Business Park, LLC.

The KMC Site is bounded by Pequawket Pond to the south, a wooded wetland to the east, Hobbs Street and American Air Systems to the west, Hobbs Street and Conway Business Park to the northwest, and Yield House/Renovator Supply, Inc. to the north.

3.1 PHYSICAL CHARACTERISTICS

The Site is level and varies in elevation from 4 to 6 ft above the base level of Pequawket Pond. The pond level is controlled by New Hampshire Water Resources Board via a downstream dam. As such, ground water levels are influenced not only by seasonal variations, but also by changes in the pond level, with an average elevation of 456 ft National Geodetic Vertical Datum (NGVD) and seasonal fluctuations of approximately 5 ft. The entire Site and portions of adjacent properties are within the 100-year floodplain of the pond. Wetlands (formerly forested) cover much of the eastern portion of the Site, while shrub/scrub wetlands fringe the western boundary. At the time of the publishing of the *ROD* (EPA, 1990), no endangered or threatened species or sensitive ecological habitats were known to exist on or adjacent to the Site. Conditions have not substantially changed, and no such species are believed to frequent the Site at present.

The Site is located in the northern portion of the Ossipee Lake Quadrangle and lies within the Saco River Valley Subdivision. The Site is located within a well-defined buried glacial valley and is underlain by Conway Granite and igneous rock. Surface topography is generally flat, varying in elevation between 460 ft and 465 ft NGVD. Bedrock beneath the Site has two major fracture orientations trending north and east. Soils underlying the Site consist of fill, fine to

medium fine sand, stratified silt, sand, and clay, and glacial till. Top of bedrock beneath the Site varies from a low of 318 ft NGVD to a high of 364 ft NGVD [approximately 100 to 120 ft below ground surface (bgs)]. The confluence of the Saco and Swift Rivers lies one mile downstream from the Site. Pequawket Brook, which widens to become Pequawket Pond, flows north and eventually empties into the Saco River. Surface water runoff from the Site generally drains to Pequawket Pond or towards the woods located east of the Site. The eastern portion of the Site contains a concrete storm drainage culvert, which runs from the Yield House parking lot south for approximately 850 ft, discharging to Pequawket Pond.

As previously noted, water levels in Pequawket Pond are controlled by a dam. The Pond is lowered once a year in the fall, and raised again in the spring. Annual fluctuations up to 5 ft in the water level of the Pond have been reported.

Ground water in the vicinity of the Site has been characterized as occurring in three zones; bedrock, deep aquifer, and shallow aquifer. The shallow aquifer at the Site consists of alluvial deposits of silty fine and fine to medium sand. The depth to water in the shallow aquifer varies from approximately 4 to 10 ft bgs. The thickness of the shallow aquifer varies between 10 and 40 ft, with the sand deposits becoming coarser and thicker towards Hobbs Street and the western portion of the Site. Ground water flow in the shallow aquifer is radial from a mound located beneath the north end of the former solid waste pile. Two water supply wells, operated by the Conway Village Fire District (CVFD), are located approximately 3,000 ft northwest of the Site, and yield up to 1 million gallons per day. These wells are screened in the shallow aquifer in an area where the alluvial sand deposits are generally coarser and more permeable than those at the Site. Figure 3-1 shows locations of the water supply wells and the Site.

The shallow aquifer is underlain by approximately 60 to 100 ft of low permeability lacustrine deposits of stratified silt, clay, and fine sand that act as an aquitard. The deep aquifer consists of a gravely, silty sand glacial till layer ranging in thickness from 7 to 45 ft. Bedrock underlying the glacial till is very dense medium to fine grained granite, with permeabilities as low as 10^{-2} to 10^{-4} ft per day. The depth to the bedrock surface ranges from approximately 100 to 140 ft bgs.

As of the publishing of the *ROD* (EPA, 1990), two buildings (No. 1 and No. 2) occupied the Site. Both rested on between 5 to 15 ft of fill. Building No. 2 has since been razed and Building No. 1

has fallen into disrepair, with large portions open to the elements and a great deal of structural damage to the walls and roof. The upper 2 ft of the fill contain varying amounts of sawdust, owing to the previous use of the Site as a sawmill. The sawdust is interspersed with sand and gravel.

3.2 LAND AND RESOURCE USE

At the time of the *Remedial Investigation(RI)/Feasability Study (FS)* (CDM, 1990), the KMC Site and all surrounding properties were all zoned for commercial/industrial use. The lots and their owners/tenants were as follows:

- **Map 27, Lot 7** – Undeveloped land located east of the Site. Owned and operated by Carroll Reed Ski Shops, Inc.
- **Map 27, Lot 7A** - Located northeast of the Site. Owned and occupied by Carroll Reed Ski Shops, Inc.
- **Map 27, Lot 8** – Owned by KMC.
- **Map 27, Lot 9** - Located west of the Site. Owned and operated by New England Embroidery.
- **Map 27, Lots 50 and 50A** - Located northwest of the Site (across Hobbs Street). Owned and operated by Carroll Industries, manufacturer of laminated wood products.
- **Map 27, Lot 50B** - Arrow Woodworking Company – Located northwest of the Site (across Hobbs Street).

Presently, the Site is owned by the defunct KMC and other businesses. The KMC property contains the treatment plant and a portion of the ground water extraction system. The remaining portion of the ground water extraction system is located on two other properties. The area surrounding the Site remains industrial/commercial. The surrounding lots and their owners/tenants are as follows:

- **Map 227, Lot 139 (formerly Map 27, Lot 7)** - Undeveloped land located east of the KMC facility. Contains a portion of the ground water extraction system. Recently owned by OCR, Inc. However, there has been a lien on the property since 1999. (Part of the KMC Site)

- **Map 227, Lot 138 (formerly Map 27, Lot 7A**) - Owned and occupied by Yield House/Renovator Supply, Inc., who has filed Chapter 11 and is currently in the process of liquidating assets and selling the property.

- **Map 227, Lot 140 (formerly Map 27, Lot 8)** - The Site containing the former KMC building and the ground water treatment plant. The defunct KMC currently owns this parcel. (Part of the KMC Site)

- **Map 227, Lot 143, (formerly Map 27, Lot 9)** - Formerly owned and operated by New England Embroidery. Currently owned by Frick and Frack, LLC. Occupied and operated by American Air Systems, Inc.

- **Map 227, Lot 182 (formerly Map 27, Lots 50 & 50A)** - Formerly owned and operated by Carroll Industries, manufacturer of laminated wood products. Currently owned by Conway Business Park, LLC. and used primarily for office space and storage, contains a portion of the ground water extraction system. (Part of the KMC Site)

- **Map 227, Lot 182 (formerly Map 27, Lots 50B)** - Currently owned by Little GEM, Inc.

A number of residences are located along Pequawket Pond, which abuts the Site to the south. There are no public beaches on the pond; however, there is a private beach belonging to the Cranmore Shores Association. The pond is also used by local residents for recreational purposes such as boating, fishing, and swimming. There are no residences on or immediately adjacent to the Site. The closest residence is approximately 600 ft from the Site, across Pequawket Pond.

Trespassers have been known to frequent the Site and surrounding properties, and this was taken into account in the human health risk assessment conducted in 1990 by Camp Dresser and McKee, Inc. (CDM) and documented in their *Remedial Investigation Report* (CDM, June 1990).

Conway receives its drinking water through a public supply, consisting of a well field operated by the CVFD. The supply wells are located approximately 3,000 ft northwest of the Site. (See Figure 3-1 for locations of CVFD wells.)

3.3 HISTORY OF CONTAMINATION

As documented in the *RI/FS* (CDM, June 1990), the primary features at the Site were two buildings (No. 1 and No. 2), a septic tank and associated leach field, a drainage culvert and two solid waste piles.

Building No. 1 was historically used for foundry operations, while Building No. 2 was used for shipping and receiving of materials. As noted in Subsection 3.1, Building No. 2 has since been razed and Building No.1 has fallen into disrepair, with large portions open to the elements and a great deal of structural damage to the walls and roof.

The septic tank/leach field area was found to be the primary source for discharge of chlorinated compounds at the Site. Compounds detected during the RI/FS included 1,1-Dichloroethane (1,1-DCA) and 1,1,1-TCA.

The *RI/FS* (CDM, June 1990) documented contamination in a waste pile located east of Building No. 1 (large waste pile – approximately 9,000 yd^3) and east of Building No. 2 (small waste pile–approximately 400 yd^3). The waste piles were generated over a period of several years during the KMC facility operation, and consisted primarily of buried drums, caustics, metal debris, and casting sands.

A storm drain culvert runs in a northwest/southwest direction along a gravel driveway approximately 200 ft east of the KMC building. The culvert collects storm water from the Yield House/Renovator Supply parking lot and also intercepts ground water from the wetland area east of the former building locations. The culvert ultimately discharges to Pequawket Pond. Remedial Investigation sampling and analysis of water and sediment in catch basins, along the drainage culvert, indicated that contaminant concentrations in the drainage pipe were highly variable and were likely influenced by flushing during precipitation events and fluctuation of elevations in Pequawket Pond as a result of the dam. During the remedial investigations, contaminant concentrations as high as several thousand parts per billion (ppb) chlorinated solvents were detected in water samples collected from the catch basins. The catch basins were sampled again in November 2000 but total VOC concentrations did not exceed 70 ppb in any of the catch basins.

As a result of historic operations at the Site, ground water became contaminated with chlorinated solvents and select metals. The ground water contamination was primarily found in the shallow aquifer, with lower levels of contamination in the deep aquifer and intermediate aquitard. Contamination was found to flow to the northeast and west of the Site. The predominant contaminant in ground water during the RI was 1,1,1-TCA, with evidence that degradation to daughter products, including 1,1-DCA, 1,2-DCA, and 1,1-Dichlorethylene (1,1-DCE) was occurring. Total VOC concentrations exceeding 100,000 ppb were observed in monitoring wells at the Site during the remedial investigations.

3.4 INITIAL RESPONSE

From the fall of 1981 to selection of the remedy in 1990, a number of response actions, culminating in completion of an RI/FS, including a human health risk assessment/ecological endangerment assessment have been completed. However, with the exception of the 1990 removal of seven drums from the waste piles, all of the pre-*ROD* response actions have been investigative in nature, including addition of the Site to the NPL in 1984. The first major removal action implemented was the source control portion of the selected remedy in the *ROD* (EPA, 1990), which is discussed in more detail in Subsections 4.1 and 4.2.

3.5 BASIS FOR TAKING ACTION

The primary basis for action at the KMC Site was the determination, through preparation of a Risk Assessment, that the release of hazardous substances from the Site has occurred to soil and ground water which may present an imminent and substantial threat to public health and the ecosystem through contact with the waste piles, and through potential future consumption of ground water impacted by Site contaminants.

4. REMEDIAL ACTIONS

4.1 REMEDY SELECTION

Remedial alternatives for source control and management of migration were assembled based on a number of Remedial Action Objectives (RAOs), which were developed in the 1990 RI/FS, including:

- Minimize further horizontal and vertical migration of contaminated ground water from the KMC Site.
- Minimize negative impacts to Pequawket Pond resulting from discharge of contaminated ground water.
- Prevent the inhalation of wind blown fine particulate materials from the waste piles.
- Reduce the risks associated with ingestion of, or physical contact with, metals in the waste piles.
- Prevent release of other contaminants in the waste piles.
- Prevent the migration of contaminants from the septic system and surrounding soils that could further degrade ground water quality.
- Reduce the risk associated with inhalation of VOCs and physical contact with the contents of the septic system or the surrounding soils.

Remedy selection was documented in the EPA's *ROD* dated 29 September 1990 for the Site. The selection was based on a comparative evaluation of several management of migration remedial alternatives and several source control remedial alternatives. Comparisons were made based on relative performance of each alternative versus a total of nine criteria, including:

- Overall Protection of Human Heath and the Environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Long-Term Effectiveness and Permanence
- Short-term Effectiveness
- Implementability

- Reduction of Toxicity, Mobility, or Volume through Treatment
- Cost
- State Acceptance
- Community Acceptance

The selected remedy(ies) as documented in the *ROD* (EPA, 1990) was/were as follows:

- Source Control – Operable Unit 1:
  - Removal of the septic tank and its contents and transport to an off-site incinerator for thermal destruction.
  - Excavation of contaminated leach field soils and disposal at an off-site Resource Conservation and Recovery Act (RCRA) Subtitle C facility.
  - Excavation and off-site disposal of the materials in the two waste piles.
- Management of Migration – Operable Unit 2:
  - Extraction of ground water and containment of plume via extraction wells or trenches.
  - Treatment of extracted water via air stripping and carbon polishing.
  - Discharge of treated ground water to the Publicly Owned Treatment Works (POTW).
  - Long-term ground water monitoring.

The selected remedy included provisions for achieving the following cleanup goals:

Ground water:

- 1,1,1-Trichloroethane - 200 microgram per Liter (µg/L)
- 1,1-Dichloroethylene - 7 µg/L
- 1,2-Dichloroethane - 5 µg/L
- Trichloroethylene - 5 µg/L
- 1,1- Dichloroethane - 4 µg/L
- Chloroform - 100 µg/L
- Chromium - 50 µg/L
- Nickel - 700 µg/L

Soil:

- 1,1,1-Trichloroethane - 300 µg/kg
- Chromium - 1,400 micrograms / kilogram (ppb) (An error see 1st bullet)

Between the signing of the *ROD* (EPA, 1990) and remedy implementation, an *Explanation of Significant Differences (ESD)* (EPA, 1992) was prepared, which allowed for the following deviations from the specifications of the *ROD* (EPA, 1990):

- The *ESD* (EPA, 1992) noted the *ROD* (EPA, 1990) contained an error in the determination of the cleanup level for hexavalent chromium in soil. The *ROD* (EPA, 1990) stated a cleanup goal of 1,400 ppb. The *ESD* (EPA, 1992) corrected this value to 1,400 parts per million (ppm).

- The *ESD* (EPA, 1992) provided for the removal of the "small" waste pile, only if analytical testing revealed hexavalent chromium results in excess of 1,400 ppm, or if the material was otherwise determined to be a threat to human health and the environment.

- The *ESD* (EPA, 1992) provided for more flexibility in the final disposition of the waste pile material, the septic tank, and it contents, so that the material could be shipped to either a Subtitle C or Subtitle D facility, depending upon waste disposal characterization results.

- The *ESD* (EPA, 2003) provided for the additional removal of source material recently found at depths of 8 to 15 feet in the Culvert Area and corrected an error in the determination of the ground water clean up level for 1,1-DCA from 4 parts per billion (ppb) to 3560 ppb.

4.2 REMEDY IMPLEMENTATION

4.2.1 Source Control – OU 1

Source control implementation was initiated on 15 July 1992, and completed on 30 September 1992. As a result, the following remedial actions were completed:

- Excavation, transportation, and disposal of approximately 13,620 tons of waste pile material to a RCRA Subtitle D landfill.

- Transportation and disposal of approximately 42 tons of crushed drums (removed from the waste piles, emptied, and crushed) to a Subtitle D landfill.

- Transportation and disposal of the contents of the septic tank (fourteen 55-gallon drums) to a hazardous waste incinerator.
- Excavation, transportation, and disposal of 12 yd^3 of leach field soils and the associated concrete septic tank to a Subtitle D landfill.
- The cleaning of a caustic mixer, and the disposal the material (two 55-gallon drums of corrosive solids) at a Subtitle C landfill.
- The transportation and disposal of two capacitors to a hazardous waste incinerator.

Post-remediation sampling indicated that clean up levels specified in the *ROD* (EPA, 1990) and in the August 1992 *ESD* (EPA, 1992) were achieved for the contaminants of concern in soil (chromium - 1,400 ppm and 1,1,1-TCA – 300 ppb).

4.2.2 Management of Migration – OU 2

Implementation of the Management of Migration portion of the remedy involved construction of a remediation system consisting of a 14 well ground water extraction system and a 42 gallon per minute (gpm) ground water treatment plant. Startup of the facility occurred on 22 September 1993.

As constructed, the remediation system at the KMC Site consisted of the following treatment processes:

- Ground water extraction from four extraction wells (EW-01, EW-02, EW-03, and EW-04) located west of the Ground Water Treatment Plant (GWTP) known as Hobbs Street wells, and ten extraction wells (EW-5 through EW-14) located southeast of the GWTP (Culvert Area wells).
- Equalization tank.
- Metals removal processes, including chemical precipitation with polymer and caustic, clarification, and filtration.
- Organics removal, including air stripping with treatment of the stripper off-gas via vapor phase carbon.
- Sludge storage.
- Discharge of the plant effluent to the sanitary sewer.

Two of the extraction wells, EW-04 (Hobbs Street) and EW-10 (Culvert Area), were taken off-line in 1996 once ground water cleanup goals were attained in the vicinity of these wells. In October 2000, Culvert Area well EW-13 was replaced with a collection trench and extraction well EW-13A to increase the volume of ground water extracted from the Culvert Area and improve capture of contaminant plume. Electric submersible pumps in each of the Hobbs Street wells yield a total of 40 gpm. Pneumatic pumps are used in the lower yielding Culvert Area wells. A current total of 2 to 3 gpm are pumped from all nine of the Culvert Area wells.

Since start up of the ground water treatment system in 1993, an average of 788,400 gallons per year (1.5 gpm) have been extracted from wells in the Culvert Area versus an average of 21,024,000 gallons per year (40 gpm) extracted from the Hobbs Street wells.

4.3 SYSTEMS OPERATIONS/OPERATION AND MAINTENANCE

The treatment plant activities have been ongoing since September 1993. The primary components of system operation are associated with the selected management of migration alternative that includes:

- Extraction of ground water and containment of plume via extraction wells or trenches.
- Treatment of extracted water via air stripping and carbon polishing.
- Discharge of treated ground water to the POTW.
- Long-term ground water monitoring.

The LTRA activities associated with the selected remedy include major maintenance, repair, modification and/or upgrade of extraction, treatment or discharge system components on an as needed basis, as detailed in the annual Operation and Maintenance (O&M) reports. In addition, routine maintenance/monitoring activities have been performed on weekly, monthly, quarterly or at a manufacturer's specified frequency (i.e., after a specified number of hours of equipment operations, etc.). These routine activities include but are not limited to:

- Inspection of Culvert Area well pumps and recording of pump cycle totalizer readings.

- Collection of grab samples throughout the treatment process for hydrogen ion concentration (pH) and iron testing.
- Cleaning and calibration of T-1 pH probe.
- Equipment rotation (pumps, blowers, etc.).
- Collection of plant influent and effluent samples and delivery to the AMRO Environmental Laboratory.
- Air compressor oil and air filter replacement.
- Removal, dismantling, and cleaning of extraction well pumps.
- Lubrication of pumps, motors, mixers, blowers.
- Cleaning of paddle wheel influent flow meter.
- Outside maintenance including snow blowing, and mowing of grass and weeds around plant and wells.
- Clarifier tank cleaning and residual sludge removal.
- Removal and cleaning of P-30 (building sump pump).
- Replacement of belts on exhaust blower.
- Inspection of interior of sand filters and leveling of media.
- Replacement of activated carbon in vapor phase carbon units.

Findings associated with these maintenance activities have been documented in the annual O&M reports.

In addition, several efficiency improvements have been made over the years, including:

- Discontinuing the addition of caustic and polymer for metals removal because influent concentrations of metals did not exceed the cleanup goals and pretreatment for iron and manganese was not necessary.
- Replacement of blowers and pumps with more suitably sized, energy efficient models.
- Modifications to well heads and pumps to facilitate easier sampling and pump servicing.

- Re-piped blower intake for air stripper to combine tank ventilation system with the air stripper intake. This eliminated the need for a tank ventilation blower, reducing power costs, and allowed unheated air from outside to be used for air stripping instead of heated air from within the plant, thus reducing heating costs.

- Modified compressor controls to decrease compressor operating time, saving significant power costs.

Annual O&M costs and total gallons processed per year for the years since the last Five-Year Review, not including costs for additional studies described in Section 5, are as follows.

Year	Gallons Per Year	Annual O&M Cost
1998	20,964,877	$180,013
1999	21,241,615	$189,996
2000	16,449,500	$227,889
2001	19,476,668	$232,728
2002	13,473,517	$281,600
2003	20,000,000 (estimated)	$285,987 (estimated)

As of May 31, 2004, O&M will become the responsibility of NHDES in accordance with the EPA Fact Sheet, *Transfer of Long-Term Response Action (LTRA) Projects to States* (EPA, July 2003). The following tasks are in need of completion prior to turnover of the LTRA to NHDES.

- Change out granular carbon in exhaust system.
- Remove and dispose of sludge in the sludge holding tank.
- Change out packing media in air stripper tower.
- Letter from EPA to NHDES regarding future equipment disposal.

5. PROGRESS SINCE LAST FIVE-YEAR REVIEW

The last Five-Year Review was completed in July of 1998. For the years 1998 through 2002, approximately 91,606,177 gallons of ground water have been extracted, treated and discharged to the local POTW. Five Annual O&M Reports have been completed and submitted to the NHDES and EPA.

In addition, several new studies of the area have been completed and documented as follows:

- Source Water Protection Area (SWPA) [a.k.a. Capture Zone Analysis] for CVFD Wells No. 1 and No. 2, EPA ID No. 0511010-001, 002, Conway, New Hampshire, Douglas Heath, EPA-New England, 17 January 2001.
- *Gore-Sorber Screening Survey Final Report*, W.L. Gore and Associates, Inc., 21 May 2002.
- Results of Vertical Profiling – Kearsarge Metallurgical Superfund Site, Weston Solutions, Inc., 16 August 2002.
- Results of Geoprobe Coring – Kearsarge Metallurgical Superfund Site, Weston Solutions, Inc., 17 December 2002.

5.1 SOURCE WATER PROTECTION AREA

The *SWPA* (EPA, 2001) study was performed in response to late 1980s early 1990s detection of trichloroethylene (TCE), 1,1,1-TCA, and methyl-tert-butylether (MtBE) in the CVFD wells, located approximately 3,000 ft from the KMC Site. None of the detections have exceeded drinking water standards. Volatile organic compounds have not been detected in the CVFD wells at greater than trace amounts. Since ground water flow is radial from the source area at the Site, the CVFD well field is located generally downgradient of the Site. The *SWPA* (EPA, 2001) study was performed by Mr. Douglas Heath of EPA – New England, and has been submitted in draft form for concurrence by the State of New Hampshire. The SWPA boundary (capture zone) of the CVFD wells, based on a 400-ft pumping radius for each well, was determined to extend in a roughly elliptical shape approximately 6,500 ft west of the wells, and approximately 1,500 to 2,000 ft north and south, respectively. The Capture Zone was determined not to include the

ground water underlying the KMC Site. Figure 5-1 (Attachment A) shows the extent of the SWPA.

Additionally, it was noted during the study that MtBE was not historically used at KMC, and has never been detected in the Site wells or off-site monitoring wells. Other potential sources of the 1,1,1-TCA, TCE and MtBE contamination in the CVFD wells exist in the area, including a State Department of Transportation garage, located less than 1,500 ft from the CVFD wells. The CVFD wells continue to be monitored for TCE, 1,1,1-TCA, and MtBE on a quarterly basis by the CVFD.

5.2 SOIL GAS SURVEYS

An active soil gas survey initially conducted by EPA in 1999 on the KMC property indicated elevated levels of 1,1,1-TCA in vapor along the southwest portion of the KMC building. In April 2002, a passive soil gas survey, using Gore-Sorber soil gas modules, was conducted to further investigate potential source areas at the KMC Site. On 15 and 16 April 2002, 50 Gore-Sorber soil gas modules were installed approximately 3 ft bgs in various locations on a grid laid out across the KMC Site. The Gore-Sorbers were left in place for approximately 15 to 16 days. The soil gas samples were analyzed for target VOCs using modified EPA Method 8260. The passive soil gas survey detected concentrations of VOCs along the northern portion of the KMC building extending to the east of the building. The complete results are available in the *Gore-Sorber Screening Survey Final Report* dated 21 May 2002 (W.L. Gore and Associates, Inc.). Both soil gas surveys found low levels of contamination; however, the data provided insight as to where to locate the follow-up investigations described below.

5.3 VERTICAL PROFILING

A modified Waterloo Profiler mounted on a Geoprobe drill rig was used to collect ground water samples at various depths in areas suspected to be potential sources of contamination at the KMC Site. Volatile organic compound analyses were performed using EPA Method 8260/8260B by the on-site EPA mobile laboratory using a transportable gas chromatograph (GC). Vertical profiling results were utilized to identify source areas and to target specific areas and depths for

additional site investigations. The vertical profiling results identified a VOC source area in the Culvert Area east of the old KMC building. The highest VOC concentrations were observed at the top of a low permeability layer encountered at a depth of approximately 8 ft bgs, approximately 30 ft southwest of extraction well EW-13A. Contours of total VOC concentrations at the top of the low permeability layer were plotted. Ground water concentrations observed in monitoring wells were used to extend the contours beyond the immediate vertical profiling study area.

5.4 GEOPROBE INVESTIGATION

Based on the information obtained during the vertical profiling activities and previous site activities, soil samples were collected to target the identified source areas at the KMC Site and further define the vertical extent of VOC contamination within the low permeability layer. The Geoprobe investigation further defined the vertical and lateral extent of the source area identified during the vertical profiling activities. The information from the Geoprobe work was used to estimate volumes of soil that would constitute a "source" and could therefore be remediated or removed to expedite achievement of cleanup goals by pump and treat. Figure 5-2 (Attachment A) shows soil contaminant concentration contours developed from the Geoprobe investigation.

Evaluation of the vertical profiling investigation, the Geoprobe investigation, and historic boring logs of wells installed at the KMC Site confirm the existence of a confining gray silt aquitard located beneath the Site. The top of the aquitard appears to exist at depths varying from 12 to 16 ft bgs in the Culvert Area extending to depths approximately 45 ft bgs in the Hobbs Street Area. A tan clayey silt layer, approximately 2 to 4-ft thick, was observed to overlie the gray silt aquitard in the Culvert Area.

During the Geoprobe investigation, soil samples were collected an average of every 2 ft within the tan clayey silt layer and the gray silt aquitard to determine the depth of penetration of VOCs in the source area soils at the KMC Site. Selected soil samples from each boring were analyzed on-site for VOCs using EPA Method 5035A/8260B using a portable GC. Based on chemical analyses of the soil samples, the highest concentrations of VOCs (greater than 1 mg/kg total VOCs) in the Culvert Area were encountered from approximately 1 ft above the top of the tan clayey silt layer, through the full depth of the tan clayey silt, and approximately 2 ft into the gray

silt aquitard. Therefore, the majority of the highly concentrated contaminant mass is located in these two layers of low permeability soils at depths from 7 to 14 ft bgs.

5.5 SOIL EXCAVATION ACTIVITIES

The results of the vertical profiling and Geoprobe investigations identified a localized area of high concentrations of chlorinated compounds in the ground water and soil in the Culvert Area of the KMC Site. Since the high concentrations are located in the saturated zone in the low permeability soils at depths of 8 to 15 ft bgs, they are acting as a continuing source of contamination to ground water and are hindering attainment of cleanup goals. EPA and NHDES have determined that additional soil excavation will be required to remove this continuing source. The *ESD* (EPA, 2003) identified the additional remedial actions that were not covered by *ROD* (EPA, 1990). The ESD was signed on September 29, 2003 and the source area soil excavation is scheduled to be performed in late fall 2003.

6. FIVE-YEAR REVIEW PROCESS

6.1 ADMINISTRATIVE COMPONENTS

The Review Team consists of the following individuals from EPA-New England and the NHDES:

- Mr. Michael Jasinski, EPA, Chief, NH/RI Superfund Section
- Mr. Richard Goehlert, EPA-New England Remedial Project Manager (RPM)
- Mr. Darryl Luce, EPA-New England – Geotechnical Support
- Margaret McDonough, EPA-New England – Risk Assessor
- Angela Bonarrigo, EPA-New England Community Affairs
- Mr. Andrew Hoffman, NHDES – Project Manager
- Mr. Paul Lincoln, NHDES – Former Project Manager

During the course of the Second Five-Year Review, the Review Team completed the following tasks:

- Collected information from local officials.
- Reviewed monitoring reports and other data and reports to evaluate whether cleanup levels were being met.
- Conducted a site visit to inspect remedy components and effectiveness.
- Interviewed local officials, and other interested parties, including nearby property owners.
- Assessed select historical data and reports.
- Facilitated community involvement.
- Submitted the Draft Five-Year Review Document.
- Addressed comments from the EPA and NHDES to the Draft Five-Year Review, and revised the document

6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

Community involvement in the Five-Year Review process for the KMC Site was initiated by the EPA RPM via a press release on 15 April 2003. The release informed the public of the upcoming review and provided contact and schedule information.

In July 2003, NHDES and EPA representatives attended a Town of Conway Selectmen's meeting to discuss the future excavation activities in the Culvert Area. The key issues mentioned were the work hours and traffic patterns to be used by future construction vehicles. An Article was published in the Conway Daily Sun on July 3, 2003, which summarized the discussion at the Selectmen's meeting and the current status of the Site.

Once this document has been finalized, a public notice will be published on the EPA website at www.epa.gov/ne/ra/gb indicating that the second Five-Year Review has been completed and that copies are available at the EPA-New England headquarters in Boston, Massachusetts, as well as in the information repository located in the Conway Public Library located on Main Street in Conway, New Hampshire.

6.3 DOCUMENT REVIEW

This Five-Year Review consisted of a review of relevant documents located in the EPA-New England files in Boston, Massachusetts, as well as other files and documents made available from the files of NHDES and WESTON, the NHDES contractor responsible for O&M at the Site. Applicable or Relevant and Appropriate Requirements, as listed in the *ROD* (EPA, 1990) and on state and federal websites were also reviewed.

6.4 DATA REVIEW

6.4.1 Historic Data/Post Remedial Investigations

As part of the RI/FS, soil, surface water, sediment, and ground water samples were collected. These data were reviewed to gain historical perspective and to provide a background for the derivation of RAOs and cleanup goals derived for the *ROD* (EPA, 1990).

Since the *ROD* (EPA, 1990), additional soil, ground water, and soil gas samples were collected to determine the reason for the lack of progress in attainment of ground water cleanup goals in the Culvert Area. These data were reviewed as part of the Five-Year Review for the Site.

6.4.2 Ground Water Monitoring Data

Ground water monitoring data and influent and effluent samples for the treatment plant have been collected routinely (generally three times per year in March, August, and December) since the startup of the ground water extraction system and treatment plant in 1993. These data have been complied in annual O&M monitoring reports. Relevant data from these reports were also reviewed in support of this Five-Year Review. Figure 6-1 (Attachment A) depicts the locations of the monitoring wells and extraction system components, as well as monitoring data (detections only) for total chlorinated VOCs over the last eight (8) years. Table 6-1 (Attachment B) contains historic VOC and metals data for all Site wells through December 2002. Figure 6-2 (Attachment A) depicts the VOC data for Site contaminants-of-concern (CoCs) from the August 2002, December 2002, and April 2003 sampling rounds. In addition, Figures 6-3 through 6-15 (Attachment A) provide graphical representation of chlorinated VOC concentrations versus cleanup goals, as well as concentration trends between January 1983 and December 2002, on a contaminant-specific basis for select Site wells.

Ground water concentrations of the two metal CoCs for the Site, chromium and nickel, have not exceeded cleanup goals since 1992, prior to startup of the remediation system. Volatile organic compound concentrations have shown a decline over the last eight years of monitoring as described in the following paragraphs.

The hydrogeologic and contaminant characteristics vary across the KMC Site. On the western portion of the Site, also known as the Hobbs Street Area, the upper sand unit is approximately 40 to 50 ft thick and the soils are medium to coarse sands and gravels. The hydraulic conductivity in the Hobbs Street Area is much greater than in the eastern portion of the Site. The combined yield of the three Hobbs Street Area wells is 40 gpm.

In the eastern portion of the Site (east of the former KMC manufacturing building) also known as the Culvert Area, the upper sand unit is only about 8 to 10 ft thick and consists of fine sand and silt deposits. Hydraulic conductivities in this unit are much lower than in the Hobbs Street Area. The current combined yield of the 8 wells and 120 ft long trench in the Culvert Area is 2 to 3 gpm.

6.4.2.1 Hobbs Street Area Wells

On the western portion of the KMC Site (Hobbs Street Area), it appears that the extraction wells have been very effective in continually reducing ground water contamination levels. Ground water samples from all of the operating extraction wells (EW-1, EW-2, and EW-3) currently have CoC (metals and VOCs) concentrations below the cleanup goals.

In the Hobbs Street Area, VOC concentrations in all but one monitoring well, MW-211, are below cleanup goals. Samples collected from monitoring well MW-211 continue to exceed the cleanup goal for TCE. The concentrations of TCE in this well have ranged from 9.5 ppb to 29 ppb during the past year, slightly above the cleanup goal of 5 ppb. Monitoring well MW-211 is screened from 31.5 to 41.5 ft bgs and is located approximately 50 ft southwest of extraction well EW-1, which is screened from 38 to 48 ft bgs. Because of the proximity of MW-211 to EW-1, and because these two wells are screened at approximately the same depth interval, it appears that the TCE contamination is very localized, and is present at such low concentrations that it is diluted to non-detectable concentrations by the time it is drawn into EW-1.

6.4.2.2 Culvert Area Wells

Although wells in the Hobbs Street Area have continued to show improvement, VOC concentrations in many of the Culvert Area wells have not decreased significantly since approximately 1997. In well EW-13, ground water concentrations of the primary contaminant, 1,1,1-TCA, are more than an order of magnitude higher than the cleanup goal 200 µg/L.

The highest ground water contaminant concentrations observed at the KMC Site during the last few years were located in the Culvert Area in the vicinity of extraction wells EW-8, EW-12, EW-13, and EW-14 and most recently in EW-13A. The contaminant plume appears to be centralized northeast of the former large waste pile and migrating toward the north and east. A passive soil gas survey, vertical profiling of ground water concentrations, and soil sample collection using a Geoprobe drill rig were conducted in 2001 and 2002. These investigations were focused in the Culvert Area where the highest ground water concentrations were consistently observed.

Results of the investigations clearly indicated a concentrated source of chlorinated organic solvents in the Culvert Area of the KMC Site. The vertical and horizontal extent of this source was delineated, and options for removal or treatment of the source material were evaluated. The majority of the contaminant mass was observed to be present in the saturated zone in low permeability soils (silt and clayey silt with hydraulic conductivities on the order of 10^{-6} centimeter per second) at a depth of 8 to 15 ft bgs. Removal of this concentrated contaminant mass by continuation of the pump and treat system will not achieve the cleanup goals in the 10-year time frame stipulated in the *ROD* (EPA, 1990). Therefore, an accelerated method of contaminant mass removal, such as excavation and off-site disposal of the source area soils, will be necessary to meet the *ROD* (EPA, 1990) requirements.

6.4.2.3 Summary of Historical Ground Water Data

Figure 6-16 depicts the groundwater contaminant plumes (using the ROD clean up goals) prior to remedial system startup, following five years of operation, and at present, respectively. As shown in this figure, the remedy appears to be functioning as intended by the *ROD* (EPA, 1990). However, as described in Subsections 6.4.2.1 and 6.4.2.2, historic ground water data indicate that, after nearly 10 years of operation of the ground water extraction and treatment system, there are still exceedances of the *ROD* (EPA, 1990) cleanup goals for select CoCs (1,1,1-TCA, TCE, 1,1-DCE, and 1,1-DCA). As a result of the 2003 ESD change to the clean up goal for 1,1-DCA, the clean up goal for 1,1-DCA is not exceeded. Although ground water contaminant concentrations have decreased overall at this Site, and the plume has decreased in aerial extent, there continues to be clean up goal exceedances in multiple wells in the Culvert Area.

6.5 SITE INSPECTION

A Site Inspection was conducted on 18 April 2003. Attendees included Bette Nowack (WESTON Project Manager), Pam Hoskins (WESTON), and Scott Hayes (WESTON O&M Site Manager). A Site Inspection Checklist is included as Attachment C. Site Inspection activities included the following:

- Collection of information required by the checklist (See Attachment C).

- Tour of the facility, including the treatment plant, the remediation system outdoor areas, the extraction well and monitoring well networks, the outside of the remaining KMC manufacturing building (Building No. 1), the Culvert Area, and the portion of the shoreline of Pequawket Pond abutting the Site (See Attachment C for photographs of the Site taken during the site inspection and a subsequent visit to the Site.).

- Interview of Mr. Thomas Steele of CVFD (See Attachment D for interview documentation).

6.6 INTERVIEWS

In addition to Mr. Thomas Steele of CVFD, the following interviews were conducted:

- Mr. Scott Hayes, WESTON O&M Site Manager, interviewed on 18 April 2003 as part of the site inspection.

- Mr. Earl Sires, Town Manager of Conway, New Hampshire – interviewed on 2 May 2003.

- Mr. Tom Mullen, Owner of Conway Business Park (abutter) – interviewed on 7 May 2003.

- Mr. Theodore Blackburn, CSP, Contract Evaluation Team of WESTON – interviewed on 3 June 2003.

Comments from Mr. Hayes are documented on the Site Inspection Checklist, located in Attachment C. Interview documentation for the remaining interviews is located in Attachment D. Attempts were made to contact other property abutters; however, these individuals either could not be located or declined to be interviewed.

During the interview with Mr. Tom Mullen, owner of the Conway Business Park, two issues were brought to light:

- It was revealed that a former tenant of the business park had noted "sewer gasses" infiltrating their building. The tenant indicated that a possible source of the off gasses could be the KMC treated ground water discharges to the local POTW. While this is highly unlikely, it may be appropriate to address this issue with the owner.

- In the same interview, Mr. Mullen expressed concerns that reuse options for his property may be limited because of "having a Superfund site across the street". Mr. Mullen indicated he would like to discuss his reuse options and restrictions with the appropriate regulatory agency. Further details are provided in the Interview Documentation, Attachment D.

It is recommended that these issues be addressed prior to completion of remediation or the next Five-Year Review, whichever comes first.

7. TECHNICAL ASSESSMENT

7.1 IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENT?

The remedy is functioning as intended by the *ROD* (EPA, 1990), with the exception that evaluation of historic and recent ground water data indicate that, after nearly 10 years of operation of the ground water extraction and treatment system, there are still exceedances of the *ROD* (EPA, 1990) cleanup goals for select CoCs (1,1,1-TCA – See Subsection 6.4.2). Although ground water contaminant concentrations have decreased overall at this Site, and the plume has decreased in aerial extent, there continues to be cleanup goal exceedances in multiple wells in the Culvert Area and one well in the Hobbs Street Area during each sampling round.

The *ROD* (EPA, 1990) states "the remedy is expected to reach target cleanup levels in all locations in the aquifer in 10 years." Further, the *ROD* (EPA, 1990) stipulated that "If after five years there is no progress, or if after 10 years cleanup levels are not attained, the ground water remedy shall be reconsidered." Due to the presence of the chlorinated solvent source in the low permeability soils, as described in Subsection 6.4, it appears unlikely that ground water cleanup goals will be attained in the Culvert Area within the 10-year timeframe specified in the *ROD* (EPA, 1990) without implementing additional remedial measures. Evaluation of data trends has indicated that unless additional source remediation is implemented, it is unlikely that all cleanup goals will be achieved in all wells, within the next 10 years of remedy implementation. The *ROD* (EPA, 1990) stipulates the remedy must be revisited in these circumstances. The following paragraphs summarize a recent evaluation of the data, taken from the *2002 O&M Report* (WESTON, 2003), and Section 9 provides recommendations for accelerating attainment of cleanup goals.

Results of the investigations described in Subsections 5.2, 5.3, and 5.4, clearly indicated a concentrated source of chlorinated organic solvents in the Culvert Area of the KMC Site. The vertical and horizontal extent of this source was delineated, and options for removal or treatment of the source material were evaluated. The majority of the contaminant mass was observed to be present in the saturated zone in low permeability soils (silt and clayey silt) at depths of 8 to

15 ft bgs. In situ chemical oxidation or stimulated biodegradation of the VOCs was not considered feasible because of the high concentrations of VOCs and the difficulty associated with distributing chemicals into the low permeability soils. The presence of the chlorinated solvent source in the low permeability soils also means that attainment of cleanup goals by pump and treat will not be achieved for decades unless other measures are taken to remove the source. Because of the relatively shallow depth of the source materials, excavation and off-site disposal is likely to be the most cost-effective approach for expedited removal of the contaminant mass. More details on the rationale for excavation and off-site disposal of the source area soils is presented in the *ESD* (EPA, 2003).

7.2 ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEANUP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF THE REMEDY SELECTION STILL VALID?

With a few exceptions, the exposure assumptions, toxicity data, federal, state and local standards, and the RAOs used at the time of the remedy selection are still valid. Table 7-1 (Attachment B) provides a comparison of toxicity profile data used in the risk assessment in support of the remedy selection versus current values reported in the Integrated Risk Information System and other EPA sources. Tables 7-2 through 7-8 (Attachment B) provide a comparison of the exposure assumptions and the toxicity data used in the 1990 Risk Assessment with current toxicity data and exposure assumptions. For this analysis, the "current use" and "future use" scenarios for the Site (including residential use of the KMC property and abutting parcels) have not been changed between the 1990 Risk Assessment and preparation of this document. Table 7-9 (Attachment B) provides a comparison of ARARs in force at the time of remedy selection versus current ARARs.

As shown in Table 7-1 (Attachment B), a number of toxicity values for the Site CoCs have remained the same. Of those that have changed, a number have been withdrawn for reevaluation, and no new numbers have been promulgated. Of note are the inhalation unit risks for several of the CoCs, which have been published since the remedy selection, where there were none before. However, as evidenced in Table 7-9 (Attachment B), the only risk-based cleanup goals for remedy selection were for 1,1-DCA and nickel, neither of which currently has a published inhalation unit risk. In addition, for chromium, the oral reference dose has decreased slightly,

while for 1,1-DCE, it has increased by an order of magnitude. For chromium, a slight increase in risk would result, but this increase is not large enough to result in unacceptable Site-wide risk, and would not require any change to the existing cleanup goal. For 1,1-DCE, a reduction in calculated risk would result. In either case, the protectiveness of the remedy has not been lessened because of the changed values.

The numbers in Tables 7-2 through 7-8 (Attachment B) indicate that with the exception of the soil and sediment ingestion rates for children, the basic exposure assumptions for both "current" and "future" reuse scenarios have not changed. It is possible that if the risks were to be recalculated using the new ingestion rate of 200 milligrams per day, slightly higher risks would result. However, since the only risk-based cleanup goals for remedy selection were for 1,1-DCA and nickel [See Table 7-9 (Attachment B)], it is highly unlikely that an unacceptable total Site risk would result.

Table 7-9 indicates that since the remedy selection, the State of New Hampshire has adopted a new Risk Characterization and Management Policy, in which are published ground water standards. According to the table, the New Hampshire published standards for the most conservative use assumptions (GW-1) for chromium and 1,1-DCA are higher than the cleanup goals published in the ROD. For chromium, 100 µg/L for GW-1 versus 50 µg/L for the ROD; and for 1,1-DCA, 81 µg/L for GW-1 versus 4 µg/L for the ROD. In addition, for nickel, the published GW-1 standard is 100 µg/L versus a ROD goal of 700 µg/L. Since ARARs are frozen at the time of the ROD, chromium is not changed to the higher level and the clean up goal of 50 µg/L remains protective. A change in the cleanup goal for nickel would not impact remedy protectiveness since levels of nickel in ground water have been below 100 µg/L since 1992.

The 2003 ESD has changed the clean up goal for 1,1-DCA to 3650 µg/L. This change corrects an error in the computations at the time of the ROD. The New Hampshire standard was published after the ROD and can not be considered an ARAR at this time. The clean up goal of 3650 µg/L for 1,1-DCA has been met through out the Site ground water. To evaluate the use of the New Hampshire published standard, Figure 7-1 depicts the effect of raising the 1,1-DCA cleanup goal from 4 µg/L to 81 µg/L instead of the 3560 µg/L established in the 2003 ESD. As shown in the figure, if the New Hampshire standard is used, a further reduction of the aerial extent of the

contaminant plume relative to this cleanup goal would be achieved from the original ROD goals as depicted in Figure 6-16. An evaluation of the data indicates that when the clean up goals are met for the other VOC contaminants, the New Hampshire published goal for 1,1-DCA will most likely be met.

7.3 HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No other information other than what has been discussed previously in this document has come to light that could call into question the protectiveness of the remedy.

7.4 TECHNICAL ASSESSMENT SUMMARY

Based on the information presented in previous subsections, the remedy is functioning as intended, but will require some modification to attain *ROD* (EPA, 1990) cleanup goals in every well within the prescribed 10-year timeframe or soon thereafter. At present however; the remedy is functioning adequately and is protective of human health, public welfare, and the environment.

8. ISSUES

In previous subsections, a number of issues surrounding the remedy implementation and O&M at the KMC Site have been described. These issues and their impacts on Remedy Protectiveness are described below:

Issue	Currently Affects Protectiveness? (Yes/No)	Affects Future Protectiveness? (Yes/No)
Changes to cleanup goal for 1,1-DCA in ground water, based on changes in toxicity data since remedy selection.	No.	No.
Contaminant concentrations in monitoring well MW-211 have been recalcitrant. TCE concentrations have consistently remained above cleanup goals, despite reductions in nearby wells screened at the same depth interval.	No.	Yes, more effective extraction may be necessary to achieve cleanup goals in this area.
The need to implement additional source excavation activities in accordance with the ESD (EPA 2003) to assure attainment of cleanup goals within a reasonable timeframe.	No.	Yes, cleanup goals will not be achieved in less than approximately 50 years unless additional source excavation activities are performed.
The need to further optimize ground water contaminant capture to expedite achievement of cleanup goals.	No.	Yes, a larger trench with a greater capture zone will allow the Culvert Area plume to be remediated in a reasonable timeframe.
Certain non-routine maintenance items are in need of being addressed, including change out of carbon vessels and cleaning or replacement of air stripper media.	No.	Yes, if non-routine maintenance is not performed, plant efficiency may be compromised.

9. RECOMMENDATIONS AND FOLLOW-UP ACTIONS

The following recommendations are intended to expedite attainment of cleanup goals in the ground water, minimize long-term O&M costs, keep the treatment plant functioning efficiently throughout the remainder of its operating life, and resolve other issues noted during this review.

Issue	Recommendation/Follow-up Action	Party Responsible	Oversight Agency	Milestone Date
Changes to cleanup goal for 1,1-DCA in ground water	Addressed in the ESD along with additional source excavation activities.	N/A	NHDES/EPA	September 2003
Recalcitrant contamination in monitoring well MW-211	Determine cause and remedy, potentially by optimizing extraction from well EW-1.	N/A	NHDES/EPA	May 2004
Continuing source of VOCs contaminating ground water.	Source area excavation is addressed in the ESD. Soils with total VOC concentrations greater than 6 mg/kg will be excavated and disposed off-site.	N/A	NHDES/EPA	October 2003
Further optimize removal of contaminant mass from Site ground water.	Install new, expanded ground water extraction trench in Culvert Area. Addressed in the ESD along with source excavation activities.	N/A	NHDES/EPA	October 2003
Certain non-routine maintenance items are in need of being addressed.	Replace primary carbon vessel with secondary carbon vessel. Acid wash or replace packing in the air stripper.	N/A	NHDES/EPA	July 2004

10. PROTECTIVENESS STATEMENT

Based on the information gathered in support of this Five-Year Review, the following protectiveness statements are made:

- The remedy at OU 1 is protective of human health and the environment.
- The remedy at OU 2 currently protects human health and the environment since a ground water extraction and treatment remedy is operating at the Site. However, in order for the remedy to be protective in the long term, additional source control and optimized ground water extraction actions need to be taken to ensure long term protectiveness.

Because the remedial action at all OU's is protective, the Site is protective of human health and the environment.

11. NEXT REVIEW

The next Five-Year Review for the KMC Site is required by September 2008, five years from the date of this review.

12. REFERENCES

Camp Dresser and McKee, Inc. (CDM), *Feasibility Study Report – Remedial Investigation/Feasibility Study – Kearsarge Metallurgical Corporation Hazardous Waste Site*, June 1990.

Camp Dresser and McKee, Inc. (CDM), *Remedial Investigation Report – Remedial Investigation/Feasibility Study – Kearsarge Metallurgical Corporation Hazardous Waste Site*, June 1990.

New Hampshire Division of Public Health Services (NHDPHS), Inter-department Communication from B.C. Strohm, Special Assistant for Health Risk Assessment to J.A. Minichiello, Assistant Director, Division of Public Health Services, Office of Waste Management, 1985.

U.S. Environmental Protection Agency (EPA), *Explanation of Significant Differences,* September 2003.

U.S. Environmental Protection Agency (EPA) 822-R-02-047, *National Recommended Water Quality Criteria*, U.S. EPA Office of Water, November 2002.

U.S. Environmental Protection Agency (EPA), *Risk Assessment Guidance for Superfund (RAGS), Volume I -- Human Health Evaluation Manual, Part A,* 1999.

U.S. Environmental Protection Agency (EPA), *Explanation of Significant Differences,* August 1992.

U.S. Environmental Protection Agency (EPA) 82-R-02-038, *Drinking Water Standards and Health Advisories*, U.S. EPA, Summer 2002.

U.S. Environmental Protection Agency (EPA) Fact Sheet, *Transfer of Long-Term Response Action (LTRA) Projects to States* July 2003.

U.S Environmental Protection Agency (EPA) 540-R-01-007, *Comprehensive Five-Year Review Guidance,* Office of Emergency and Remedial Response, June 2001.

U.S. Environmental Protection Agency (EPA), *Source Water Protection Area (SWPA)* (a.k.a. Capture Zone Analysis) *For Conway Village Fire District Wells No. 1 and No. 2, EPA ID# 0511010-001, 002, Conway, NH*, Douglas Heath, EPA-New England, 17 January 2001.

U.S. Environmental Protection Agency (EPA)*, Record of Decision,* 29 September 1990.

U.S. Environmental Protection Agency (EPA), 1989g, 540/1-89/001, *Risk Assessment Guidance for Superfund, Volume II Environmental Evaluation Manual*, Interim Final.

U.S. Environmental Protection Agency (EPA) 1989e, *Drinking Water Standards and Health Advisories*, U.S. EPA Office of Drinking Water, October 1989.

U.S. Environmental Protection Agency (EPA) 1989d, *Health Effects Summary Tables*, Second Quarter FY 1989, April 1989.

U.S. Environmental Protection Agency (EPA) 1989c, *Exposure Factors Handbook*, Office of Health and Environmental Assessment, July 1989.

U.S. Environmental Protection Agency (EPA) 1989b, 901/5-89-001, *Supplemental Risk Assessment Guidance for the Superfund Program*, Region 1 Risk Assessment Group, June 1989.

U.S. Environmental Protection Agency (EPA) 1989a , *Risk Assessment Guidance for Superfund*, Human Health Manual Part A, Office of Solid Waste and Emergency Response, July 1989.

U.S. Environmental Protection Agency (EPA) 1988b, *Proposed Guidelines for Exposure-related Measurements*, 53FR48830, December 1988.

U.S. Environmental Protection Agency (EPA) 1988a, *Superfund Exposure Assessment Manual*, Office of Emergency and Remedial Response, April 1988.

U.S. Environmental Protection Agency (EPA) 40/186/060, *Superfund Public Health Evaluation Manual,* Prepared by ICF for Office of Emergency and Remedial Response, October 1986.

U.S. Environmental Protection Agency (EPA), *Development of Statistical Distributions or Ranges of Standard Factors Used in Exposure, Assessments*, *Office of Health and Environmental Assessment,* 1985.

Weston Solutions, Inc. (WESTON), 2002d, *Operations and Maintenance Report, Kearsarge Metallurgical Corporation Superfund Site, Conway, New Hampshire*, June 2003.

Weston Solutions, Inc. (WESTON), *Draft Source Removal Justification Memo* dated 7 February 2003.

Weston Solutions, Inc. (WESTON), 2002b, *Results of Geoprobe Coring – Kearsarge Metallurgical Superfund Site*, 17 December 2002.

Weston Solutions, Inc. (WESTON), 2002a, *Results of Vertical Profiling – Kearsarge Metallurgical Superfund Site*, 16 August 2002.

Weston Solutions, Inc. (WESTON), 2002c, *Kearsarge Metallurgical Corporation (KMC), Building 1 – Evaluation of Structure and Security Issues*, 17 March 6, 2002.

W.R. Gore and Associates, Inc. *Gore-Sorber Screening Survey Final Report*, 21 May 2002.

ATTACHMENT A

FIGURES

Click on the Bookmarks listed under Attachment A to view figures